Project no. INCO-CT2006-015110

IRIS

Irkutsk Regional Information System for Environmental Protection
Integrating and strengthening the European Research Area

Instrument Specific Support Action

Thematic Priority Environmental Protection

Deliverable D.1.2 Quarterly Report (Year I, Quarter II)

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Dissemination Level		
PU	Public	PU
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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Section 1 – Project objectives and major achievements during the reporting period

Project objectives

The Irkutsk Regional Information System for Environmental Protection – 'IRIS' assesses the current status and dynamics of the Irkutsk region's forestry environment, influenced by man-made changes and anthropogenic impact arising from pollution sources and other negative anthropogenic drivers located in the region and in adjacent areas. It will investigate the responsiveness and vulnerability of forestry environment within the region under different scenarios of industrial development and nature-preserving measures.

The output of the project is the adaptation of the existing GIS layers, completion and transfer into operative testing and exploitation a simplified version of the Regional Information System that serve as a prototype for other regions of Northern Eurasia. The project also includes the preparation of the detailed prospective studies and explorations aiming at the development of the efficient simulation and management tool for practical use by regional governance and nature-protection service(s). The tool will help to manage the risks associated with man-made changes and anthropogenic stress affecting the forest ecosystem of the region under investigation, as well as other regions of Northern Eurasia.

The major goal of IRIS is to efficiently share Earth Observation data and domain-specific (ecologic and economic) information within earth science community and regional governance to identify environmental impacts that are both economic and socially responsible. Thus, for integrated environmental management methodical designs are necessary which refer to the complexity of the natural resource to be managed and the difficulty to predict the factors or driving forces influencing them.

Following the principle of interoperability IRIS is planned to become part of a distributed network of similar systems where not only data is being distributed and shared, but also applications are being offered and used throughout the network. IRIS is thus using standards published by the World Wide Web Consortium (W3C®), the Open Geospatial Consortium (OGC™) or the International Organization for Standardization (ISO). On the long-term, decision makers and earth science communities will highly profit with applications, where domain-specific knowledge and information has been rigorously categorized.

Major achievements during the reporting period

IRIS builds on former Framework Programme 4 and 5 projects, extends their networks to Russia and adopts some of their findings to the specific needs of the involved governmental agency. This implements for the first time that the scientific results from former EC-funded scientific co-operations are being collected and transformed to tools for regional management by the administration. Thus, the first reporting period dealt with questions like:

What is currently available from finished and on-going projects, from consortium's heritage?
The information and methodological basis of the project intends to be developed in the form of a regional information system. The GIS being already developed by some Russian and international groups includes a number of levels highly relevant to the objectives of this study. The project supplements this GIS by other layers, adapt the system and transfer it into operative testing and exploitation. A wide dissemination of a system is planned by preparation of both CD and Internet oriented version.

What is currently available from recent technological developments?
It is a methodical challenge to derive sound parameter sets from Earth Observation data and to implement spatial tools in large regions and, at least across administrative boundaries. In this context IRIS will profit

from recent technological developments, like (1) universal connectivity (internet, web), (2) comprehensive analysis environments (GIS, spatial databases), (3) standards for data, metadata and services (like OGC), or (4) communication platforms for computer-supported cooperative work.

Where did we go from here during the reporting period? There is a
- need for more structure and documentation of what is available,
- need for strategies to make data and information synergistically available (GIS-compatible),
- need to build up both, spatial high-resolution information and time series,
- need for the involvement of IRIS users in the development process.

Subsequently and according to the workplan, additional information/data are collected and investigated for the domains (1) remote sensing information, (2) information on man-made changes and stress sources and (3) the development of GIS as well as strategies for efficient communication among IRIS developers and IRIS users.

With an adequate infrastructure, Earth Observation data can serve as the base for analysing landscape structure and related socio-economic and environmental processes at multiple scales. IRIS generates and compounds domain-specific knowledge from both sides the information providers and the information users. Besides investigating long-term regional environmental problems, Earth Observation data sets are of major relevance for providing on-demand information such as for large and partly inaccessible regions like the Irkutsk region.

The use of satellite-based EO data and derived information for environmental applications is commonly hindered by mismatches between information user and information provider. The underlying cause is that remote sensing sensors are the front-end stage and complex data manipulation is needed in the process flow in order to meet the user's requirements for the final thematic content. The initial satellite vision system focuses on a specific spectral and spatial domain at a particular point in time. The transformation of such records into reliable information is controlled by the capabilities of image processing and expertise about the ground. Data of different EO sensors in different spectral, spatial and temporal dimensions need to be made compatible and synergistically available to be in line with user's demands. Altogether this limits the use of EO data but nevertheless EO platforms are the primary data source for up-to-date information, whereas derived landscape units are regarded as primary units for further landscape quantification and modelling. Thus, IRIS concepts set high value on advanced database integration of multi-resolution EO data/products. For concept and knowledge building, the involvement of the IRIS user community is the most challenging objective and remains an ongoing process.

Section 2 – Workpackage progress of the period

The quarterly report refers to the second quarter of year 1, months 4-6 (see table 1). Active Workpackages (WP) for this period are WP 2000 and WP 3000. WP 4000 is in discussion. WP 1000 is reported in Section 3.

Table 1: Reported Workpackages.

Work Package	**Year 1**				**Year 2**			
	I	**II**	**III**	**IV**	**I**	**II**	**III**	**IV**
WP 1000								
WP 2000								
WP 3000								
WP 4000								
WP 5000								
WP 6000								
Months	from 1 till 3	from 4 till 6	from 7 till 9	from 10 till 12	from 13 till 15	from 16 till 18	from 19 till 21	from 22 till 24

WP 2000 follows the break-down structure as defined in the IRIS work programme. The first nine months of IRIS are being used to firstly collect additional in-situ and remote sensing data and metadata for Irkutsk region. Tasks concern the collection of satellite remote sensing data (archived and newly obtained) for forest monitoring (WP 2100), collection of in-situ data (WP 2200), thematic processing of the collected remote sensing data and their adjustment for inclusion in Regional GIS (WP 2300).

In parallel with WP 2000, implementation of **WP 3000** was also performed. During the first three months of IRIS the current man-made changes and pollution sources in the Irkutsk region are assessed (WP 3100).
The hypotheses on major potential pollution sources will be also formed and carefully checked (WP 3200). Output of WP 3000 is an input for WP 4000 (start month 10).

The results of previous two work packages will serve as an input for **WP 4000** focused on update of existing GIS for Irkutsk region. Currently, the GIS being developed for the Irkutsk region by IIASA together with a number of Russian institutions includes a number of layers (landscape, soil, vegetation, forests), which could be effectively used for the goals of the regional information system on environmental protection and anthropogenically-driven risk assessment. However, in order to serve as a basis of IRIS, the GIS requires to be supplemented and adapted to friendly user interface. This prototype of the IRIS-GIS will allow an assessment of state and functioning of the regional forests, to identify areas of rapid changes, which require operative monitoring, and to estimate environmental risk in different aspects. From another side, an expert system for assessing the impacts of negative anthropogenic drivers on forests (WP 4100/3) will serve as a basis for preparing of programs of new advance studies and research initiatives.

WorkPackage 2000

Objectives

- To collect additional available remote sensing data for the region under study to update existing GIS (e.g. historical and Russian acquisitions).
- To collect additional available in-situ data for the region under study to update existing GIS.

Progress towards objectives

⇒ Deliverable 2.1.: Database of additionally collected remote sensing data for the region under study.

The work package considers spatial, spectral and temporal resolution demands by combining a variety of EO products and is thus in agreement with the suggested key issues by latest landscape research: data acquisition and scaling. Two important scale-specific characteristics need to be accounted for: first the spatial, spectral and temporal resolution of each image pixel and secondly the image characteristics themselves, i.e. geographical area, combined band-widths and temporal duration. Within these data sets, only objects with "real-world relevance" may serve as suggested units over a range of scales.

For D.2.1, data of different EO sensors in different spectral, spatial and temporal dimensions are collected. Long-term and temporal high-resolution EO data such as the TOMS/OMI Aerosol Indices, MODIS fire data or SPOT-VGT NDVI were transformed into monthly respective yearly composites. Recent acquisitions in different spectral domains like Monitor-E or Envisat-ASAR data were acquired to derive reliable and up-to-date information on forest extent and changes. High-resolution imagery such as from Quickbird (Google ™) can be used to describe anthropogenic-driven impacts and developments as well as to validate area-wide EO products. It is a methodical challenge to make these data sets compatible and synergistically available.

♦ D.2.1.1 TOMS/OMI UV Aerosol Index (AI)

The "Total Ozone Mapping Spectrometer (TOMS)" and the "Ozone Monitoring Instrument (OMI)" provide high resolution global information about the total ozone content as well as aerosol distribution of the atmosphere. TOMS data represent the primary long-term, continuous record of satellite-based observations available for use in monitoring global and regional trends in total ozone and aerosols over the past 25 years. Two data sets are processed within IRIS:

- TOMS (on Nimbus-7) monthly means from daily global 1.0° x 1.25° products from January 1980 – December 1992 (Source: ftp://toms.gsfc.nasa.gov/pub/nimbus7/data/aerosol/) and
- OMI TOMS-like (on Aura) monthly means (see figure 1) from daily global 0.25° x 0.25° products from August 2004 – now (Source: ftp://toms.gsfc.nasa.gov/pub/omi/data/Level3e/aerosol/).

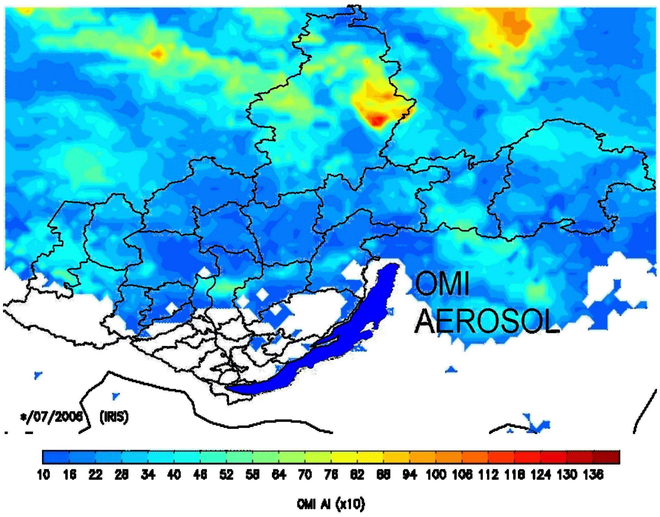

Figure 1: UV Aerosol Index from OMI on Aura: monthly mean July 2006. High AI values might due to smoke from forest fires (⇒ D-2-1-1-OMI-Aerosol.rar).

♦ D.2.1.2 MODIS Land Product Time-Series

Different MODIS Land products have been obtained and processed (see table 2). MODIS is designed to provide a comprehensive series of global land and atmosphere observations in the visible and infrared regions of the spectrum. Four daily MODerate-resolution Imaging Spectroradiometer (MODIS) observations are available to contribute to global monitoring, the Terra instrument acquires 10:30 am and 10:30 pm, the Aqua instrument 2:30 pm and 2:30 am. The MODIS products used inhere are gridded (500 m and 1km) composites over a daily, 8-day, monthly or yearly interval. The product uncertainties are well defined. Products thus are ready for use in scientific publications. Native MODIS data files have been released in the Sinusoidal projection. The tile coordinate system has horizontal and vertical tile numbers. Tiles are 10 degrees by 10 degrees at the equator. Irkutsk region coverage was obtained by merging four tiles (see figure 2). From January 1, 2007 onward data are being processed as version 005 products. Historical acquisitions of MODIS data (version 004) are being reprocessed.
(Source: NASA Earth Observing System Data Gateway http://edcimswww.cr.usgs.gov/pub/imswelcome/)

Table 2: Processed MODIS Scientific Data Sets (⇒ **http://www.iris.uni-jena.de/sites/download.html**)

Product	Synonym	Time coverage	Ground resolution	Used SDS
Land Cover Type	MOD12Q1	Yearly (2001- 2004)	1000 m	Land Cover Types 1-5
Land Cover Dynamics	MOD12Q2	Yearly (2001- 2004)	1000 m	Onset Greenness (Increase, Decrease)
Vegetation Indices	MOD13A3	Monthly (May-Sep for 2000 and 2006)	1000 m	EVI, NDVI
Thermal Anomalies/Fire	MOD14A1	Daily summed to yearly (2000-2005)	1000 m	Most confident detected fire
Vegetation Continuous Fields	MOD44B	Yearly (2000)	500 m	Percent Tree Cover

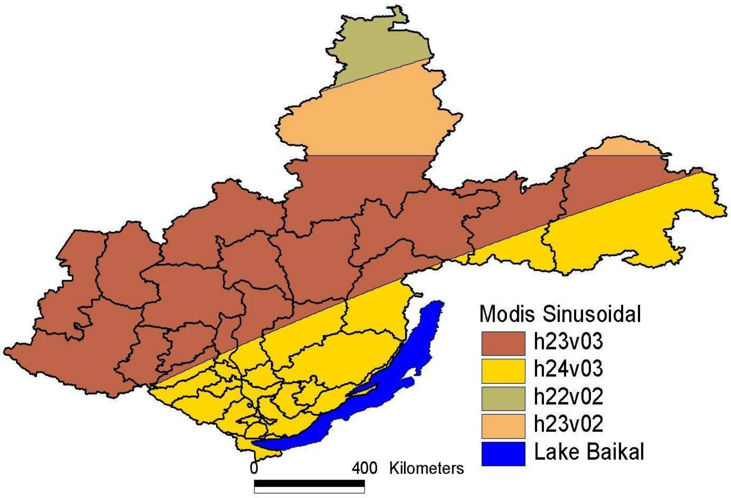

Figure 2: Map coverage: Four MODIS tiles (h22v02, h23v02, h23v03, h24v03) were merged and transformed from Sinusoidal into Geographic projection to cover the entire Irkutsk region (⇒ D-2-1-2-MODIS-tiles.rar).

Fire locations are detected using daily 4- and 11-micrometer brightness temperatures (data: courtesy of S. Bartalev). For the Irkutsk region, forest fire distribution for the years 2000 - 2005 is displayed in figure 3. Irkutskij, Ol'khonskij, Kachugskij and Zhigalovskij districts were most affected by forest fires.

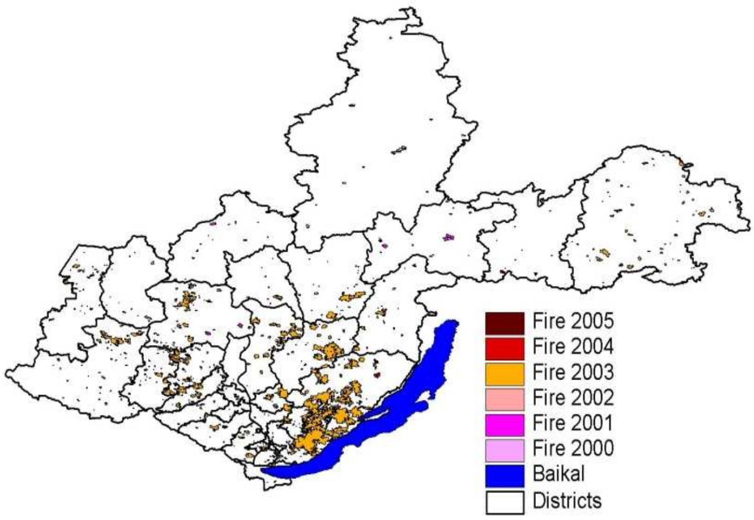

Figure 3: Fire distribution 2000-2005 (data: courtesy of S. Bartalev, ⇒ D-2-1-2-MOD14-Fire.rar).

♦ D.2.1.3 SPOT-VGT Seasonal NDVI Trends

Time series analyses of 6-year record satellite observation of seasonal SPOT-VGT mosaics for Northern Eurasia were carried out and trends in vegetation photosynthetic activity were assessed. SPOT-VGT time coverage is 1998-2005 for summer and fall, 1999-2005 for spring season with a ground resolution of 1km. Trends are the increase/decrease of NDVI per year (HÜTTICH et al., 2006). Tundra or disturbed areas show an increase or "greening" of vegetation. Districts most affected are Katangskij, Nizhneudinskij and Ust'-Ilimskij. In contrast, and after excluding impacts like clearcuts, fires or insect calamities, there are areas with decreasing photosynthetic activity, also called "browning" of vegetation (BUNN et al. 2006). Most notably affected areas are in Ust'-Kutskij, Kirenskij and Bodajbinskij district.

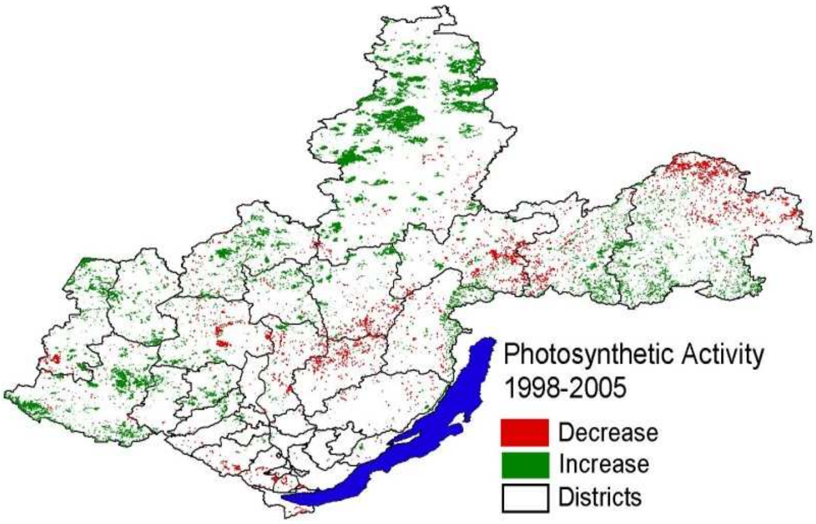

Figure 4: Positive and negative trends of summer NDVI 1998-2005. Trends at 95% confidence level (data: courtesy of Christian Huettig, FSU Jena, ⇒ D-2-1-3-SPOT-VGT-NDVI-trends.rar).

HÜTTICH, C., HEROLD, M., SCHMULLIUS, C., EGOROV, V. and BARTALEV, S.A. (2006): Indicators of Northern Eurasia's Land Cover change Trends from SPOT-VEGETATION Time Series Analysis 1998-2005. In: *International Journal of Remote Sensing.* [In Review]

BUNN, A.G. and GOETZ, S.J. (2006): Trends in Satellite-Observed Circumpolar Photosynthetic Activity from 1982 to 2003: The Influence of Seasonality, Cover Type, and Vegetation Density. In *Earth Interactions*, Volume 10 (2006).

♦ D.2.1.4 Resurs, Okean, Meteor and Monitor

Remote sensing data search was carried out for acquisitions from Resurs, Okean, Meteor and Monitor satellites (see figure 5 and table 3). The focus was set on Monitor-E and Meteor-3M data (see figure 6). The Monitor-E remote Earth-probing satellite is the first Russian satellite in a family of small spacecrafts, which are designed to serve as an EO constellation for environmental monitoring in regional scale. Monitor-E, launched on August 26, 2005, operates on sun-synchronous circular orbit with the orbit inclination 97.5° at an altitude of about 550 km. The instruments payload of this satellite includes two imagers, a panchromatic imager (spectral band 0.58 – 0.8 µm, spatial resolution in nadir 8 m over a 93.8-km wide swath) and a multichannel imager (spectral bands 0.54 – 0.59; 0.63 – 0.68; 0.79 – 0.9 µm, spatial resolution in nadir 20 m over a 160-km wide swath; Research Centre for Earth Operative Monitoring http://eng.ntsomz.ru/spacecraft/monitor_e/). In the early phases of its orbital life Monitor E ran into some problems, when Khrunichev Space Center lost all contact and control of the Monitor-E satellite.

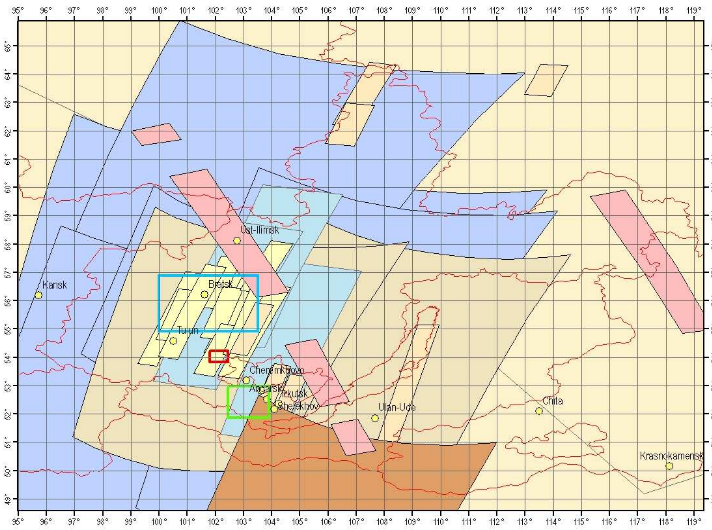

Figure 5: Map coverage of acquisitions from Russian satellite systems for the Irkutsk regio (⇒ D-2-1-4-RussianSAT-coverage.rar).

Table 3: Specifications of Russian satellite systems.

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satellite	device	swath width	ground resolution
Resurs-01 '2,3	MSU-E	45 km	45 m
	MSU-SK	600 km	175 m
Okean-O '1	MSU-SK	620 km	150 m
Meteor-3M '1	MSU-E	80 km	35 m
	MSU-SM	2250 km	225 m
Monitor-E '1	RDSA	150 km	20 m

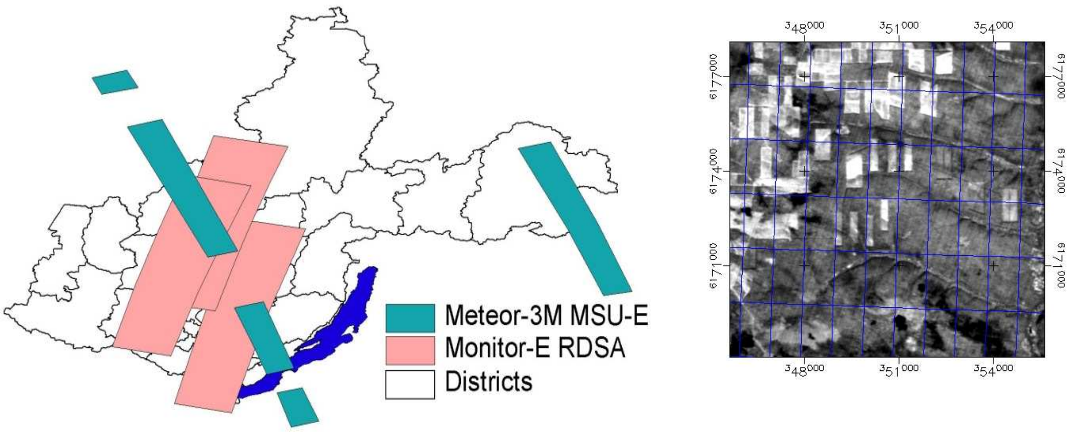

Figure 6: Map coverage of selected Meteor and Monitor acquisitions. Pictured right: Monitor-E RDSA acquisition from 16th of August 2006. For comparison only, the geographic grid represents MODIS 1km gridding.

♦ D.2.1.5 ENVISAT ASAR/AP

Forest/Non-forest area maps can be generated using high-resolution, cross-polarized Envisat ASAR (C-Band-SAR) precision images acquired at large incidence angles (swath 7). Main processing steps include image preprocessing (orthorectification, image mosaicing, speckle reduction, sigma nought calculation etc.), segmentation, image classification and accuracy assessment. Figure 7 shows coverage of Envisat ASAR/AP images for 2006 (see table 4) and 2007 for the Irkutsk region.
For future SAR acquisitions it is of special interest that the participant FSU is Principal Investigator for ALOS PALSAR (L-Band-SAR) and therefore entitled to receive data for the Irkutsk region.

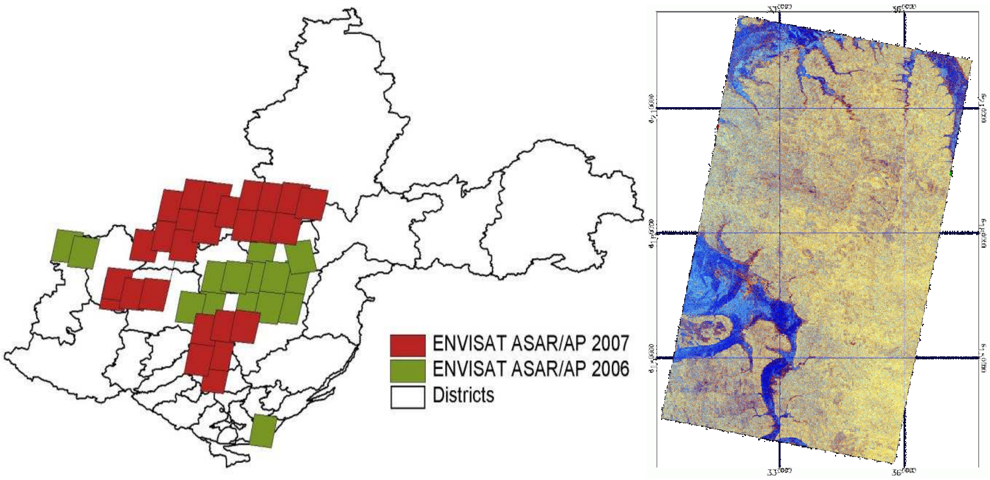

Figure 7: Map coverage of Envisat ASAR/AP images for 2006 and 2007 for the Irkutsk region (⇒ D-2-1-5-ENVISAT-ASAR-coverage.rar). Pictured right: false color intensity (back scattering) image of HV and HH polarization. In blue color the Angara flood plain.

Table 4: Specification of Envisat ASAR/AP acquisitions in 2006.

PRODUCT	MISSION	SENSOR	DATE	SCENE_CENTER
ASA_APH	Envisat	ASAR/AP	22.01.2006	57.47 97.95
ASA_APH	Envisat	ASAR/AP	08.02.2006	56.59 106.32
ASA_APH	Envisat	ASAR/AP	08.02.2006	55.7 106.07
ASA_APH	Envisat	ASAR/AP	08.02.2006	52.16 105.14
ASA_APH	Envisat	ASAR/AP	11.02.2006	57.47 105.13
ASA_APH	Envisat	ASAR/AP	11.02.2006	56.59 104.88
ASA_APH	Envisat	ASAR/AP	11.02.2006	55.7 104.63
ASA_APH	Envisat	ASAR/AP	14.02.2006	56.59 103.45
ASA_APH	Envisat	ASAR/AP	14.02.2006	55.7 103.2
ASA_APH	Envisat	ASAR/AP	27.02.2006	56.59 105.6
ASA_APH	Envisat	ASAR/AP	27.02.2006	55.7 105.35
ASA_APH	Envisat	ASAR/AP	02.03.2006	56.59 104.16
ASA_APH	Envisat	ASAR/AP	05.03.2006	55.7 102.48
ASA_APH	Envisat	ASAR/AP	14.03.2006	57.16 98.59

♦ D.2.1.6 High-resolution data and derivations

High-resolution images were obtained from Google™. High-resolution forest/non-forest masks derived from Quickbird scenes can be used for both, forest inventory and remote sensing product validation. The high-resolution preview image shown on the right (see figure 8) is meant to provide a convenient way to view the spatial resolution of MODIS time series products portrayed in D.2.1.2.

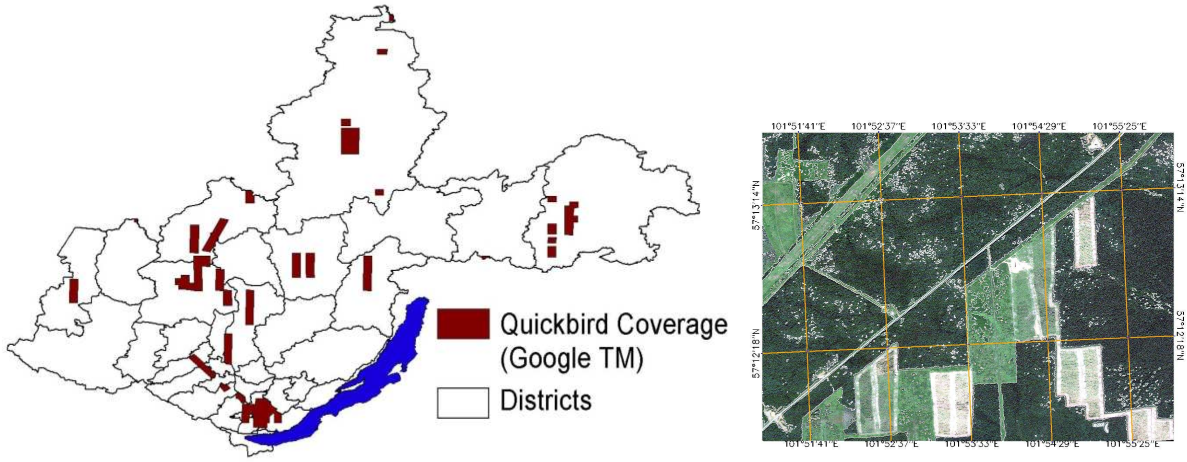

Figure 8: Map coverage of high-resolution Quickbird images (Google™, updated 30 August 2006, ⇒ D-2-1-6-Quickbird-coverage.rar). Pictured right: clear cuts south of the city of Bratsk (Google™, 21 July 2002). For comparison only, the geographic grid represents MODIS 1km gridding.

WorkPackage 3000

Objectives

- To assess the current and historical man-made changes and negative impacts arising from pollution sources and other anthropogenic drivers located in the Irkutsk region and in adjacent areas.
- To gather information on actual and potential sources of pollution in the region under study and in the proximity of its border

Progress towards objectives

⇒ Deliverable 3.1.: Dataset on pollution sources in the region under study
- ⇒ D-3-1-POLLUTION-tables.rar
- ⇒ D-3-1-4-ENV-IMPACT-maps.rar
- ⇒ D-3-1-4-ENV-IMPACT-maps.pdf

♦ D.3.1.1 Dataset on pollution of atmosphere

The tables reflect the dynamics of the gross emissions of the polluting substances, which have been emitted with the industry exhaust gas pollution into the atmosphere of the region in 2003, 2004 and 2005.

Parameters: Territory;
Polluting substances;
MAC - Maximum Allowable Concentration (maximum single & daily average);
Class of hazard;
Excess above MAC (average, minimum, maximum);
Excess above all-Russia level (number of times);
Source of pollution (industry)

Table D.3.1.1.2003.atmosphere.xls
Table D.3.1.1.2004.atmosphere.xls
Table D.3.1.1.2005.atmosphere.xls

♦ D.3.1.2 Dataset on pollution of surface waters

The tables reflect the dynamics of the gross emissions of the polluting substances, which have been emitted with the sewage waters into the water bodies of the region in 2003 and 2005.

Surface waters: Irkutsk water-storage reservoir;
Angara river in the site of Irkutsk-Angarsk cities;
Bratskoe water storage reservoir (Angara river);
Ust'-Ilimskoe water storage reservoir (Angara river);
Irkut river; Olkha river; Kaya river; Ushakovka river; Kuda river; Kitoy river; Belaya river; Oka river; Vikhorevka river; Lena river

Parameters: Territory;
Polluting substances;
Place of Location; Amount (excess);
Criterion of the Level of the water pollution;
Pollution index;
SCIPW: Specific Combined Index of the Pollution of the Water

Table D.3.1.2.2002.surfacewaters.changes.2003.xls
Table D.3.1.2.2003.surfacewaters.xls
Table D.3.1.2.2005.surfacewaters.xls

♦ D.3.1.3 Dataset on pollution of soils

The tables reflect the dynamics of the gross emissions of the polluting substances, which have been emitted with the industry exhaust gas pollution into the soils of the region in 2003, 2004 and 2005. Disturbed lands by branches of the national economy and soils remediation 2005.

Parameters: Territory;
Enterprise;
Land’s damage;
Grounds complained for the reporting year, ha;
Place of Location; Amount (excess);
Polluting substances (pesticides);

Decrease of the pollution's level, in comparison to 1996, number of times;
Disturbed, abandoned, remediated lands, ha

Table D.3.1.3.2003.soils.emissions.xls
Table D.3.1.3.2003.soils.complained.xls
Table D.3.1.3.2005.soils.remediation.xls

♦ D.3.1.4 Maps of Complex Impact, Pollution of Atmosphere, Hydrosphere and Bioenvironment

The information on complex impact, pollution of atmosphere, hydrosphere and bioenvironment only exist as scanned maps. Reference and map notations are in Russian. To supplement the IRIS-GIS by this new and relevant layers, selected maps need to be made GIS-compatible and synergistically available.

⇒ D-3-1-4-ENV-IMPACT-maps.rar
⇒ D-3-1-4-ENV-IMPACT-maps.pdf

D.3.1.4.1 Complex Impact

(118)
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Overall general component ejection out of heat-electric generating stations and boiler plants to the atmosphere;
Overall content of waste solids from heat-electric generating stations and boiler plants
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Waste water content
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Daily sortie number
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(133)
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(135)
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(137)
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D.3.1.4.3 Bioenvironment

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Agricultural land soils exposed to erosion;
Erosion types and their occurrence in the agricultural lands
(145)
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Absolute increase and decrease in the cultivatable land areas before reforms
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Disturbance of lands at the moment of agrarian relation reform beginning
Recultivation of lands before reforms;
Annual average degree of damage and recultivation of lands
(147)
Environmental protecting impact of woodlands;
Lands without forests;
Forest industry centers
(149)
Disturbance degree;
Vegetation state characteristic
(150)
Forest land disturbance;
(151)
Insect pests and forest pathogens complexes;
A. Spontaneous complexes;
B. Anthropogenic complexes

WorkPackage 4000

Objectives

- To assemble available open data sources for IRIS GIS
- To develop easy-to-use IRIS GIS interface for use by policy makers, scientists and the public

Progress towards objectives

⇒ Further development of the technical concept of the Online-GIS

♦ Requirements analysis

Requirements analysis will be an important part of the GIS system design process, whereby GIS engineers identify the needs or requirements of the users/clients. Once user requirements have been identified, the system designer is then in a position to design a solution. We will employ a combination of prototyping and use cases to establish the exact requirements of the users, so that a system that meets the needs is produced. Summarized, requirements analysis is the task of communicating with users to determine what their requirements concerning the IRIS-GIS are. Thus, the involvement of the IRIS user community is the most challenging objective and remains an ongoing.

♦ Contributions to standards

One of essential components of IRIS will be an Open Source GIS system. Open Source technology is a growing field that encourages the free sharing of software, codes and services. The goal of the Open Geospatial Consortium (OGC) is to promote standard open software interfaces called OpenGIS. These interfaces will enable geoprocessing so that different geospatial systems are able to communicate with each other. The use of common languages such as XML or GML enable easy integration between systems. OpenGIS supports the easy retrieval of geospatial information in a distributed environment, regardless of physical location of the data. These distributed datasets can then be combined and rendered for display.

♦ GIS engineering

The Spatial Data Base will be implemented as 3-tier architecture with (1) database server, (2) application server and (3) internet browser. In our case, (1) PostgreSQL, the highly scalable, SQL compliant, open source object-relational database management system with the PostGIS extension and (2) Geoserver or Mapbender Client Suite as Mapserver. PostGIS follows the Simple Features for SQL specification from the Open Geospatial Consortium.

The Geoserver will act as a thin, portable, OpenGIS-compliant web services layer on top of existing data sources (even simple file directories). Geoserver supports open protocols from the OGC to produce KML/KMZ, GML, Shapefiles and more (http://docs.codehaus.org/display/GEOS/Home). In the first stage, Geoserver will act as IRIS Open Web Service to make IRIS results (metadata and vector layers) available via KML-links to Google's Earth Community Tool.

For the second and final stage, it is in discussion that the Mapbender Client Suite as a framework for managing spatial data services will be implemented as IRIS Online-GIS. Mapbender provides interfaces not only for displaying and navigating but also for querying OGC Open Web Services. Moreover, Mapbender provides interfaces for user and group administration and management functionality for maps displayed and data served by OGC Open Web Services.

Mapbender software seems to be optimal for the realization of the IRIS Online-GIS, because it covers the following topics (http://www.mapbender.org):

- Web-GIS Client (OGC WMS, WFS, Catalog Service Client)
- Geo-CMS (Content Management System)
- Web-based Digitizing/Editing Functionality (OGC WSF-T Client)
- Security Management (Authentification, Authorization)
- Accounting Management (Logging)
- Spatial Web Services Orchestrating

♦ Communication Platform

The Communication Platform, that will come along with the prototype Online-GIS serves as the basis for computer supported cooperative work. – 'The more people who use the platform, the more valuable it becomes.' - We are implementing MediaWiki, a free and open source software that is used to organize and facilitate collaborative work. Due to the strong emphasis on multilinguality in the Wikimedia projects, internationalization has received significant attention by developers. The user interface has been fully or partially translated into more than 70 languages (http://www.mediawiki.org).

Section 3 – Consortium management and coordination

Consortium management tasks

Administrative coordination included the task of preliminary payment. Partner No. 5, the Irkutsk Science Center did not provide bank details yet.

Comments regarding contributions

As defined in the work plan, each partner has well defined responsibilities within the project. First deliverables have to be submitted after 6 months. To monitor the progress of the workpackages and to check it regularly against the work plan, the coordinator is using modern communication technology for the communication between the different partners. Teleconferences at regular intervals (two-week) using voice-over-IP technologies are held with Russian partners in Irkutsk, Moscow and St. Petersburg.

Co-ordination activities in the period

In order to disseminate the results of the study carried out in the framework of the project, the following actions are foreseen:

(1) strengthen communication between partners by teleconferences and the next meeting,

(2) to develop an IRIS dissemination database on science and economy, on national as well as international levels

The dissemination of IRIS activities will be strengthened with the upcoming IRIS web services. Coming along with a first Online-GIS, the communication platform (called IrisWiki) will help partners to quickly find and view information and applications relevant to their roles and responsibilities (English and Russian language). With such a platform, partners can make more information available to partners on a "pull" basis.

IrisWiki will serve as a powerful tool for communication within the project, for developer issues and even more important, for the collection of user requirements. The IrisWiki will document GIS-developments, specifications and discussions of standards in an ongoing process.

Project Meetings

- Kick-off meeting July 7-8 2006, organized by FSU and the ORESP team of the ISC
- 2nd IRIS meeting is planned to be held in May 2007 at NIERSC, St. Petersburg, Russia or at Vienna, Austria.

Section 4 – Other issues

Internal Reports

(1) Kick-off meeting July 7-8 2006, Irkutsk Science Center - 'Minutes of the meeting'

(2) Use of GoogleEarth imagery for the generation of high resolution ground-truth data
Objective: Digitizing small-scale features (clear cuts, housing, industrial facilities etc.) from high-resolution Quickbird imagery within Google Earth-Pro software.

(3) Workflow for an integration of GoogleEarth high-res imagery
Objective: For validation purposes: acquisition of information (e.g. digitalization of clearcuts) from GoogleEarth's-Quickbird coverage at no cost.

(4) Preliminary Investigation on Satellite-based Atmospheric Data and Information Services
Objective: Pre-scanning of the Irkutsk region for aerosol distribution using online data and information services (TOMS, OMI, MODIS Online Visualization and Analysis Systems and Goddard Chemistry Aerosol Radiation and Transport Model Products).

Presentations on Conferences

Frotscher, K. & C.C. Schmullius (2006): Projects and Initiatives addressing Environmental Impact Studies in Northern Mongolia and the Lake Baikal Region. 2nd International Conference on Land cover/Land use study using Remote Sensing and Geographic Information System, Ulaanbaatar, Mongolia, 8-9 June 2006.

Frotscher, K. & C. Thiel (2006): Forest Monitoring in the Framework of a Regional Information System for Environmental Protection. ENVIROMIS Conference, Tomsk, Russia, 1-8 July 2006.

SIB-ESS-C Symposium, 18th-20th September 2006, University of Leicester, UK
Environmental change in Siberia - Insights from Earth Observation and modelling.

Planned:
SibFORD Kick-Off, 09-10 February 2007, Potsdam, Germany

ENVISAT Symposium 2007, 23-27 April, Montreux, Switzerland
Title: The Irkutsk Regional Information System for Environmental Protection (IRIS)